Site: Westlake ldf
ID #: MOD079909322
Break: 1.8
Other:
8-2-89
0714

DOCUMENTATION RECORDS FOR HAZARD RANKING SYSTEM

INSTRUCTIONS: As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference.

FACILITY NAME: Westlake Landfill

LOCATION: 13570 St. Charles Rock Road, Bridgeton
St. Louis County, Missouri

DATE SCORED: July 17, 1989 (Revised)

PERSON SCORING: John Madras

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):

Missouri Department of Natural Resources (MDNR) Files
Nuclear Regulatory Commission reports
USGS Documents

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

Air Route
Direct Contact
Fire & Explosion


40055884
SUPERFUND RECORDS

COMMENTS OR QUALIFICATIONS:

QA Ecl
8/2/89
WAG

1. OBSERVED RELEASE

Contaminants detected (5 maximum):

Uranium in monitoring wells S-53, I-56, I-58, I-59, S-60, I-62, I-67, S-75, D-81, S-82, D-83, S-84, S-88, D-92, and D-93 (Reference 10, Appendix E)

Groundwater flow is generally to the northwest (Reference 10 page III-6 to 7) Well I-73 is located to the east of the facility and was chosen to represent background conditions. However it contains low level radiation which most likely originated from the site.

Further background wells were identified in the Burns & McDonnell hydrogeologic investigation report as wells D-89, S-53, S-52, S-51, D-90, S-80, I-50 and D-91. (Reference 10, page III-22 to 23) Contaminants were absent from all of these wells except S-80, I-73 and S-53. A review of Reference 10 indicated that wells S-51, S-52 and S-53 may not represent background all of the time, and that more water level readings were needed to determine if wells D-91 and I-50 (which are adjacent to well S-80) are outside of the area of influence of the landfill. (Reference 17)

The detection limit was 0.4 pCi/l for uranium (Reference 16). The Oak Ridge Associated Universities participates in rigorous quality assurance programs.

Score = 45 for Observed Release (Reference 5, page 9)

Rationale for attributing the contaminants to the facility:

Uranium ore processing residues are known to have been deposited in the landfill. (Reference 15, page 4) Groundwater monitoring in and around the landfill has established that radioactive material has entered the groundwater and that the contamination has reached perimeter wells. (Reference 1, page 11) No other source of the contaminant is located in the vicinity of the landfill. The contaminant was not detected in background wells except as noted above.

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WESTLAKE QUARRY LANDFILL

OBSERVED RELEASE DATA

Compound	Release/ Background	Well Number	Well Depth (feet)	Observed Concentration (PCi/l)
Uranium[1]	Release	S-53	23.7	22.0[2]
	Release	I-56	61.1	8.9
	Release	I-58	60.0	13.0
	Release	S-60	21.0	19.0
	Release	I-67	35.4	7.4
	Release	S-75	26.0	16.0
	Release	D-81	61.5	4.9
	Release	S-82	26.5	13.0
	Release	S-84	31.5	9.0
	Release	D-92	143.6	17.0
	Release	D-93	119.2	6.0
	Background	I-73	50.0	3.0

Underlined values represent significant observed releases of uranium.

[1] Sampling for uranium was conducted from May 7, 1986 through May 8, 1986. (Reference 10, pager II-7)

[2] The detection limit for uramium was 0.4 pCi/l. (Reference 16)

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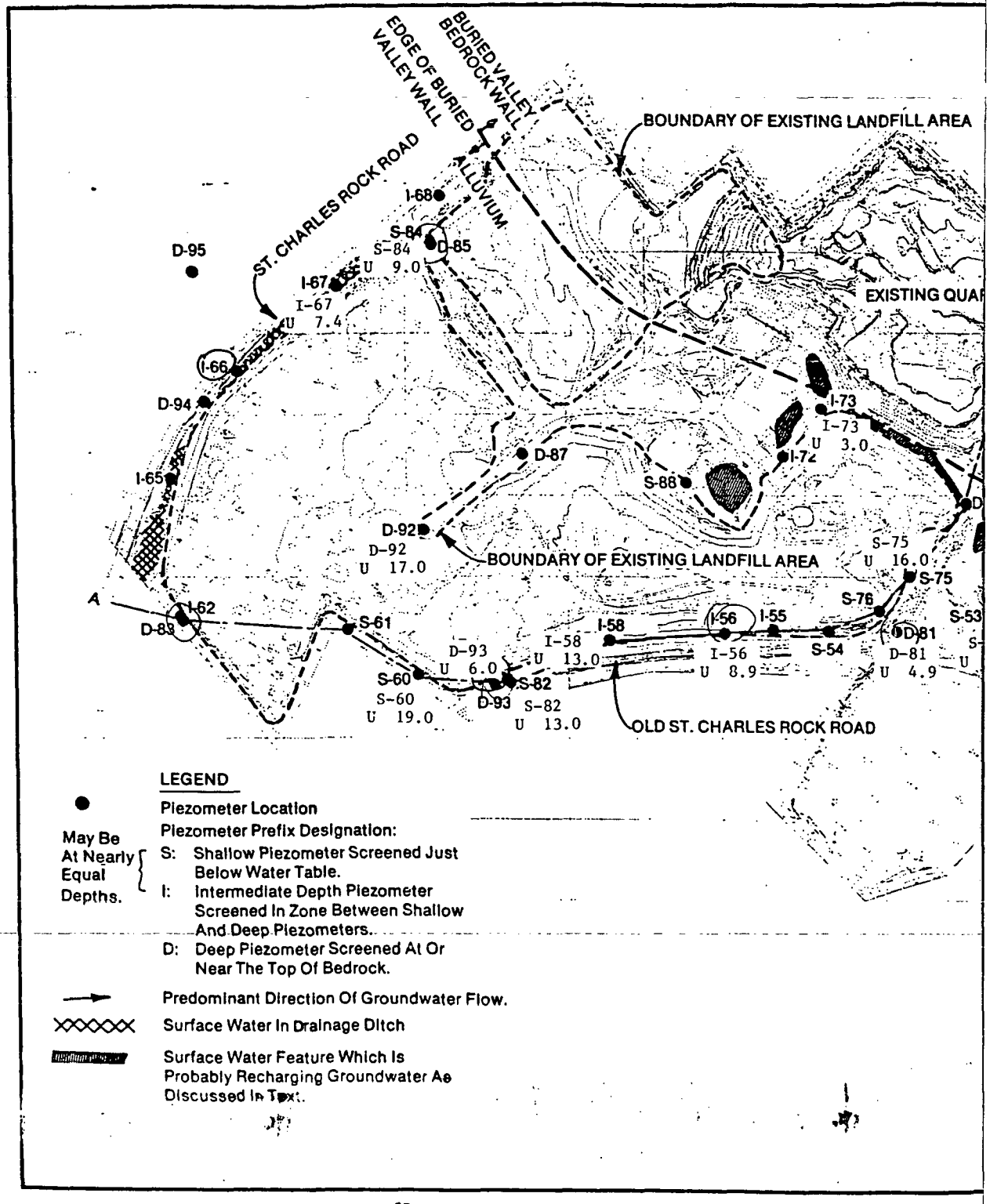
8/2/89
D. W. Ackerman


BURIED VALLEY BEDROCK WALL
EDGE OF BURIED VALLEY WALL
ALLUVIUM
ST. CHARLES ROCK ROAD
BOUNDARY OF EXISTING LANDFILL AREA
EXISTING QUAR
D-95
I-68
S-84
S-84
D-85
S-84 U 9.0
I-67
I-67
U 7.4
I-66
D-94
I-65
D-87
S-88
I-73
I-73
U 3.0
I-72
D-92
D-92
U 17.0
BOUNDARY OF EXISTING LANDFILL AREA
S-75
U 16.0
S-75
S-76
S-53
A
I-62
D-89
S-61
I-58
I-56
I-55
D-81
S-54
D-81
U 4.9
D-93
I-58
U 13.0
I-56
U 8.9
S-60
S-82
S-60
U 19.0
D-93
S-82
U 13.0
OLD ST. CHARLES ROCK ROAD
LEGEND
Piezometer Location
May Be At Nearly Equal Depths.
Piezometer Prefix Designation:
S: Shallow Piezometer Screened Just Below Water Table.
I: Intermediate Depth Piezometer Screened In Zone Between Shallow And Deep Piezometers.
D: Deep Piezometer Screened At Or Near The Top Of Bedrock.
Predominant Direction Of Groundwater Flow.
Surface Water In Drainage Ditch
Surface Water Feature Which Is Probably Recharging Groundwater As Discussed In Text.

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

The aquifer of concern is the Missouri River alluvium which consists of clay, silt and gravel. The alluvium includes thick deposits of glacial outwash and some river terrace deposits, and fills the deeply eroded bedrock channel formed by the Missouri River (Reference 10, page I-2). In general, the alluvium becomes coarser-grained with depth. (Reference 10, page I-3) The deep Missouri River alluvium, which is under about ten feet of more recent alluvium, acts as a single aquifer of very high permeability. This aquifer is relatively homogeneous in a downstream direction and decreases in permeability near the valley walls. A profile of the aquifer is presented in Reference 10 (page I-6). The depth of the aquifer increases from edge of the buried valley wall toward the Missouri River. It is 28 feet deep at well D-89 which is near the buried valley wall and increases to 110 feet at the riverward well D-83. Well logs show no discontinuities in the alluvial aquifer. (Reference 18) The groundwater of this aquifer flows generally to the northwest. (Reference 10, page III-6 to 7) The base of the limestone aquifer is formed by the relatively impermeable Warsaw shale. The Warsaw shale acts as an aquiclude. (Reference 1, page 6)

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depth from the ground surface to the lowest point of waste disposal/storage:

***

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WAC

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual lake or seasonal evaporation (list months for seasonal):

Net precipitation (subtract the above figures):

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Permeability associated with soil type:

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

***

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3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Method with highest score:

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Uranium. Uranium is known to have been deposited at this site.

Compound with highest score:

Uranium.

Score = 18 For Toxicity/Persistence (Reference 5, page 18; Reference 6, page 3445)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

The original amount of radioactive material was 8700 tons of barium sulfate sludge containing 7 tons of uranium ore processing waste. This was mixed with 39,000 tons of soil before being deposited in the landfill. (Reference 15, page 4) The material had been stored by Cotter Corporation under Nuclear Regulatory Commission license at 9200 Latty Avenue, Hazelwood, Missouri. This waste was originally reported to have been disposed at St. Louis County sanitary landfill area No. 1 (Reference 15, page 2) A subsequent NRC investigation clarified that a total of over 43,000 tons of waste were removed from the Latty Avenue site and that htis material was dumped at the Westlake Landfill. (Reference 15, page 3)

Score = 8 for Hazardous Waste Quantity (Reference 5, page 19)

Basis of estimating and/or computing waste quantity:

The amount of radioactive material was known at the time of disposal, as described above. (Reference 15, page 4)

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5. TARGETS

Ground Water Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

There are at least fifteen known private drinking water wells within three miles of the facility. Groundwater is being used as a drinking water source, for other domestic purposes and for irrigation. (Reference 1, page 6; Reference 7, map; Reference 12; Reference 13; Reference 20)

No municipal water from alternative unthreatened sources is presently available to these users. (Reference 14)

Score = 3 for Ground Water Use (Reference 5, page 24)

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

The nearest well is about 2500 feet from the facility. (Reference 20) Seventeen additional wells are within three miles of the facility. (Reference 7, map; Reference 12; Reference 13)

Distance to above well or building:

The nearest well is about 2500 feet from the facility. (Reference 20, map; Reference 9, map showing distance)

Score = 3 for Distance to Nearest Well (Reference 5, page 26)

Population Served by Groundwater Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

At least fifteen wells provide drinking water. (Reference 12 identifies eleven homes and two businesses; Reference 7 shows two additional wells not documented in Reference 12) The human population estimated to be served is at least 57. (Homes and businesses identified by References 7 and 12 times 3.8)

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Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

At least 480 acres of cropland (rowcrops and produce) are irrigated from wells within the three mile radius. (Reference 13) The population equivalent is 720 people.

Total population served by groundwater within a 3-mile radius:

The population served by groundwater is at least 777.

Score = 2 for Population Served (Reference 5, page 27)

Score = 16 for Distance to Nearest Well/Population Served (Reference 5, page 25)

***

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SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

None.

Score = 0 for Observed Release (Reference 5, page 29)

Rationale for attributing the contaminants to the facility:

Surface water was not sampled.

***

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Radioactive gases have been detected in the atmosphere above the landfill. (Reference 3, page 17) Buried deposits extend in excess of 20 feet in depth from the highest point of detection. They are also present on the surface of the sideslope of the landfill where they are available for migration by overland flow. (Reference 3, page 42) The slope from the top of the landfill to the location where the subsurface radioactive deposit intersects the sideslope is about 20%. The top of the landfill slopes less than 1 percent. (Reference 10, page I-6)

Name/description of nearest downslope surface water:

An unnamed, permanently flowing tributary to the Missouri River drains the site. The tributary is located about 1000 feet west of the landfill. (Reference 9)

Average slope of terrain between facility and above-cited surface water body in percent:

The landfill slopes directly to drainage ditches, which discharge to the tributary. Average slope between lowest point of documented contamination on the landfill sideslope (elevation 460 feet) and the tributary is about 4 percent. The elevation of the surface water was determined to be 440 feet. (Reference 3, page 42; Reference 9; Reference 10, page I-6)

Score = 2 for Facility Slope and Intervening Terrain (Reference 5, page 31)

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Is the facility located either totally or partially in surface water?

No. (Reference 9)

Is the facility completely surrounded by areas of higher elevation?

No. (Reference 9)

1-Year 24-Hour Rainfall in Inches

2.9" (Refeence 5, page 33)

Score = 2 for 1-Year 24-Hour Rainfall (Reference 5, page 32)

Distance to Nearest Downslope Surface Water

The landfill is about 1000 feet from the tributary and about 1.25 miles from the Missouri River. (Reference 9)

Score = 2 for Distance to Nearest Downslope Surface Water (Reference 5, page 32)

Physical State of Waste

Radioactive gases have been detected above the landfill surface. (Reference 3, page 17) The buried radioactive material intersects the surface of the ladfill sideslope. (Reference 3, page 42) Radon is water soluble and is available to wash into surface waters from the landfill. (Reference 1, page 10)

Score = 3 for Physical State of Waste (Reference 5, page 16)

***

3. **CONTAINMENT**

Containment

Method(s) of waste or leachate containment evaluated:

Some of the radioactive contaminated soil is at or near the surface of the landfill. (Reference 1, page 5)

Method with highest score:

Landfill not covered and no diversion system present.

Score = 3 for Containment (Reference 5, page 35)

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4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Uranium. Uranium is known to have been deposited at this site, and has been detected on the surface of the sideslope of the landfill (Reference 3, page 42).

Compound with highest score:

Uranium.

Score = 18 for Toxicity/Persistence (Reference 5, page 18; Reference 6, page 3445)

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

The original amount of radioactive material was 8700 tons of barium sulfate sludge containing 7 tons of uranium ore processing waste. This was mixed with 39,000 tons of soil before being deposited in the landfill. (Reference 15, page 4) The material had been stored by Cotter Corporation under Nuclear Regulatory Commission license at 9200 Latty Avenue, Hazelwood, Missouri. This waste was originally reported to have been disposed at St. Louis County sanitary landfill area No. 1 (Reference 15, page 2) A subsequent NRC investigation clarified that a total of over 43,000 tons of waste were removed from the Latty Avenue site and that htis material was dumped at the Westlake Landfill. (Reference 15, page 3)

Score = 8 for Hazardous Waste Quantity (Reference 5, page 19)

Basis of estimating and/or computing waste quantity:

The amount of radioactive material was known at the time of disposal, as described above. (Reference 15, page 4)

***

5. TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

The Missouri River has state-designated beneficial uses of irrigation, livestock and wildlife watering, protection of aquatic life, commercial fishing, boating, and drinking water, and industrial water supplies. (Reference 4, page 57) No beneficial uses are specifically designated for

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the permanently flowing tributary of the Missouri River that drains the landfill area. (Reference 4) No water supply intake is located within 3 miles downstream of the hazardous substance.

Score = 2 for Surface Water Use (Reference 5, page 34)

Is there tidal influence?

No. (Reference 9)

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

NA (Reference 9)

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Areas of freshwater wetlands may be present within one mile of the facility. (Reference 9)

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

NA

Score = 0 for Distance to a Sensitive Environment (Reference 5, page 37)

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None.

Score = 0 for Population Served/Distance to Water Intake Downstream (Reference 5, page 38)

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Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

There is no known irrigation from the permanently flowing stream which drains the landfill area.

Total population served:

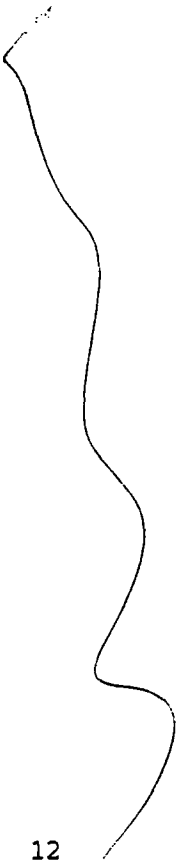
NA

Name/description of nearest of above water bodies:

NA

Distance to above-cited intakes, measured in stream miles.

NA



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AIR ROUTE

Not Scored

1. OBSERVED RELEASE

Contaminants detected:

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

***

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

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Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3. TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

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Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

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FIRE AND EXPLOSION

Not Scored

A score for the fire and explosion hazard mode has not been computed. Neither a state or local fire marshal has certified that the facility presents a significant fire or explosion threat to the public or to sensitive environments. Field observations have not demonstrated a fire or explosion threat.

1. CONTAINMENT

Hazardous substances present:

Type of containment, if applicable:

* * *

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

* * *

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REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found:

Reference Number	Description of the Reference
1.	U. S. Nuclear Regulatory Commission, Radioactive Material in the West Lake Landfill, Summary Report, NUREG-1308, Rev.1, June 1988.
2.	U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of St. Louis County and St, Louis City, Missouri, May 1982.
3.	Radiation Management Corporation, Radiological Survey of the West Lake Landfill, St. Louis County, Missouri, NUREG/CR-2722, U.S. Nuclear Regulatory Commission, May 1982.
4.	Missouri Code of State Regulations, Rules of the Clean Water Commission, Chapter 7, Water Quality Standards, 10 CSR 20-7.031.
5.	U.S. Environmental Protection Agency, Uncontrolled Hazardous Waste Site Ranking System - A User's Manual, 1984.
6.	Sax, N. Irving and Lewis, J., Sr., Dangerous Properties of Industrial Materials, Seventh Edition. Van Nostrand Reinhold, New York. 1989.
7.	Scott A. Meierotto letter to West Lake Quarry with map attachment, dated January 14, 1982.
8.	Roy D. Blunt, Missouri Secretary of State, Official Manual State of Missouri 1987-1988.
9.	U.S. Geological Survey, St. Charles, Missouri; 7.5 minute quadrangle map, revised 1974.
10.	Burns & McDonnell, Hydrogeologic Investigation West Lake Landfill Primary Phase Report, October 1986.
11.	EPA Forms 8900-1, Notification of Hazardous Waste Site, filed by various waste haulers who deposited solid waste in Westlake Landfill.
12.	Mike Struckhoff, Memo to John Madras, dated June 30, 1989.
13.	John Madras, Memo to Westlake Quarry Landfill File, dated July 14, 1989.
14.	Record of phone conversation between Dave Pruitt, St. Louis County Water Co., and John Madras, dated June 6, 1989.

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Reference Number	Description of the Reference
15.	U. S. Nuclear Regulatory Commission, IE Investigation Report No. 76-01, dated January 5, 1977.
16.	Record of phone conversation between Clayton Weaver, Oak Ridge Associated Universities and John Madras, dated July 18, 1989.
17.	Janese Neher, Memo to Miles H. Stotts, dated June 16, 1989.
18.	Division of Geology and Land Survey, Well Logs of the Missouri River Floodplain of St. Louis County north of Route 115.
19.	Record of phone conversation between John Meadows and Lynn Hartman, and John Madras dated July 26, 1989.
20.	Record of phone conversation between Mike Struckhoff and John Madras, dated July 26, 1989.

DIRECT CONTACT

Not Scored

1. **OBSERVED INCIDENT**

Date, location, and pertinent details of incident:

* * *

2. **ACCESSIBILITY**

Describe type of barrier(s)

* * *

3. **CONTAINMENT**

Type of containment, if applicable:

* * *

4. **WASTE CHARACTERISTICS**

Toxicity

Compounds evaluated:

Compound with highest score:

* * *

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Ref. b.

Dangerous Properties of Industrial Materials

Seventh Edition

Volume III

N. IRVING SAX

and

RICHARD J. LEWIS, SR.

VAN NOSTRAND REINHOLD
NEW YORK

SYNS:
2,4-DIHYDROXYPYRIMIDINE
2,4-DIOXOPYRIMIDINE
HYBAR X
PIROD
2,4-PYRIMIDINEDIOL
2,4-PYRIMIDINEDIONE
2,4(1H,3H)-PYRIMIDINEDIONE (9CI)
PYROD

TOXICITY DATA:	CODEN:
pic-esc 1 g/L	ZAPOAK 12,583,72
cyt-mus-ipr 15 ng/kg	NULSAK 19,40,76
orl-rat TDLo: 18 g/kg (17-22D preg/21D post): REP	OYYAA2 22,109,81
orl-rat TDLo: 616 mg/kg (7-17D preg): REP	OYYAA2 22,85,81
orl-rat TDLo: 378 g/kg/30W-C: ETA	CNREA8 46,2062,86
ipr-mus LD50: 1513 mg/kg	JPETAB 207,504,78

EPA Genetic Toxicology Program. Reported in EPA TSCA Inventory.

THR: Moderately toxic by intraperitoneal route. An experimental tumorigen. Experimental reproductive effects. Mutagenic data. When heated to decomposition it emits toxic fumes of NO_x.

UNJ810 *HR: 3*

URACIL mixture with TEGAFUR (4:1)

CAS: 74578-38-4 NIOSH: YR 0480000

mf: $C_8H_9FN_2O_3 \cdot 4C_4H_4N_2O_2$ mw: 648.59

SYNS:
FT mixture with URACIL (1:4)
TEGAFUR mixture with URACIL (1:4)
1-(2-TETRAHYDROFURYL)-5-FLUOROURACIL mixture with URACIL (1:4)
UFT
URACIL mixture with FT (4:1)
URACIL mixture with 1-(2-TETRAHYDROFURYL)-5-FLUORO-URACIL (4:1)

TOXICITY DATA:	CODEN:
orl-rat TDLo: 713 mg/kg (7-17D preg): TER	OYYAA2 22,85,81
orl-rat TDLo: 891 mg/kg (7-17D preg): REP	OYYAA2 22,85,81
orl-rat TDLo: 2503 mg/kg (7-22D preg/21D post): TER	OYYAA2 22,109,81
orl-rat LD50: 1580 mg/kg	OYYAA2 20,1009,80
orl-mus LD50: 1275 mg/kg	OYYAA2 20,1009,80
orl-dog LD50: 150 mg/kg	OYYAA2 20,1009,80
orl-rbt LD50: 242 mg/kg	OYYAA2 20,1009,80

THR: Poison by ingestion. An experimental teratogen. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of F^- and NO_x. See also URACIL.

UNS000 *HR: 3*

URANIUM

CAS: 7440-61-1 NIOSH: YR 3490000

DOT: 2979

af: U aw: 238.00

PROP: A heavy, silvery-white, malleable, ductile, softer-than-steel, metallic element. Mp: 1132°, bp: 3818°, d: 18.95 (ca). Radioactive material.

SYN: URANIUM METAL, PYROPHORIC (DOT)

Reported in EPA TSCA Inventory.

OSHA PEL: TWA 0.25 mg(U)/m^3
ACGIH TLV: TWA 0.2 mg(U)/m^3; STEL 0.6 mg(U)/m^3
DFG MAK: 0.25 mg/m^3

DOT Classification: Radioactive Material; Label: Radioactive and Flammable

THR: A highly toxic element on an acute basis. The permissible levels for soluble compounds are based on chemical toxicity, while the permissible body level for insoluble compounds is based on radiotoxicity. The high chemical toxicity of uranium and its salts is largely shown in kidney damage which may not be reversible. Acute arterial lesions may occur after acute exposures. The most soluble uranium compounds are UF_6, $UO_2(NO_3)_2$, UO_2Cl_2, UO_2F_2, and uranyl acetates, sulfates, and carbonates. Some moderately soluble compounds are UF_4, UO_2, UO_4, $(NH_4)_2U_2O_7$, UO_3, and uranyl nitrates. The rapid passage of soluble uranium compounds through the body tends to allow relatively large amounts to be taken in. Soluble uranium compounds may be absorbed through the skin. The least soluble compounds are high-fired UO_2, U_3O_8, and uranium hydrides and carbides. The high toxicity effect of insoluble compounds is largely due to lung irradiation by inhaled particles. This material is transferred from the lungs of animals quite slowly.

A very dangerous fire hazard in the form of a solid or dust when exposed to heat or flame. It can react violently with air; Cl_2; F_2; HNO_3; NO; Se; S; water; NH_3; BrF_3; trichloroethylene; nitryl fluoride. During storage it may form a pyrophoric surface due to effects of air and moisture. Depleted uranium (the ^{238}U-by-product of the uranium enrichment process, with relatively low radioactivity) is used in armor-piercing shells, ship or aircraft ballast, and counterbalances. Uranium is also used in making colored ceramic glazes.

UOA000 *HR: 3*

URANIUM AZIDE PENTACHLORIDE

CAS: 55042-15-4

mf: Cl_5N_3U mw: 457.32

THR: A radioactive material. An explosive. When heated to decomposition it emits very toxic fumes of Cl^- and NO_x. See also URANIUM and AZIDES.

UOB100 *HR: 3*

URANIUM CARBIDE

CAS: 12070-09-6

mf: UC mw: 250.04

THR: A radioactive material. The powdered carbide ignites spontaneously in air. See also URANIUM.

Site: Westlake Ldfl
ID #: MOD079960932
Break: 1.8
Other:

WESTLAKE LANDFILL

Narrative Summary

The Westlake Landfill is located on the floodplain of the Missouri River near the City of Bridgeton, in St. Louis County, Missouri. The Bridgeton community has a population of about 18,000 people and is located adjacent to the site. The City of St. Charles, Missouri is also located in the site's vicinity. Scattered residences are located throughout the area. The landfill is located near prime agricultural land. Commercial and industrial sites are adjacent and near the landfill as well. The geology of the area is alluvial, with Missouri River deposits overlying limestone. Seven tons of uranium ore processing residues are known to have been deposited in the landfill. The extent of contamination by uranium has been well characterized, and consists of two areas within the landfill. Radioactivity has also been detected in the groundwater. The uranium is known to have been owned by Cotter Corporation at the time it was deposited. Pursuant to the Missouri Hazardous Waste Management Law, the site is listed on the Registry of Confirmed Abandoned and Uncontrolled Hazardous Waste Sites in Missouri.

Quality Assured
8 & 9 August 2 1984
Dr. William A Cantrell Jr.

RCRA/NPL POLICY QUESTIONNAIRE FOR INITIAL SCREENING

Site Name Westlake Landfill

City Bridgeton State Missouri

Facility I.D. Number MOD079900932

Type of Facility: Generator____ Transporter____ TSD____

I. RCRA APPLICABILITY	yes	no
Does the facility have RCRA interim status?	___	X
Did the facility ever have RCRA interim status?	___	X
Does the facility have a final or post-closure permit? If so, date issued_____	___	X
Is the facility a non-notifier that has been identified by states or EPA?	___	X
Is the facility a known or possible protective filer?	___	X

STOP HERE IF ALL ANSWERS TO QUESTIONS IN SECTION I ARE NO

Quality Assured
August 2, 1989
Dr. William A Cleary Jr

Facility name: Westlake Landfill

Location: Bridgeton, Missouri

EPA Region: VII

Person(s) in charge of the facility: Francis Baldwin*

13570 St. Charles Rock Road

Bridgeton, Missouri

Name of Reviewer: John Madras Date: February 8, 1989

General description of the facility:

(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)

The Westlake Landfill has been an active landfill for over two decades. It is located on the Missouri River Flood plain in St. Louis County, Missouri. In addition to accepting sanitary refuse, it has also accepted wastes from chemical production facilities and unranium processing facility. Due to the observed release of uranium [illegible], the route of major concern is the groundwater route. The aquifer of concern is used as a drinking water supply for some local residents. Chemical and radiological data from water were used to score the site. This is a state lead site.

Scores: $S_M = 29.85$ ($S_{gw} = 51.02$ $S_{sw} = 8.00$ $S_a =$ NS)

$S_{FE} =$ NS

$S_{DC} =$ NS

NS=Not scored

FIGURE 1
HRS COVER SHEET

*Francis Baldwin is the registered agent for the owner and operator of Westlake Landfill.

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August 2, 1989
Dr. William A. Stanley Jr.

Ground Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
1 Observed Release	0 (45)	1	45	45	3.1
If observed release is given a score of 45, proceed to line 4. If observed release is given a score of 0, proceed to line 2.					
2 Route Characteristics					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score				15	
3 Containment	0 1 2 3	1		3	3.3
4 Waste Characteristics					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					3.5
Ground Water Use	0 1 2 (3)	3	9	9	
Distance to Nearest Well/Population Served	0 4 6 8 10 / 12 (16) 18 20 / 24 30 32 35 40	1	16	40	
Total Targets Score			25	49	
6 If line 1 is 45, multiply 1 x 4 x 5. If line 1 is 0, multiply 2 x 3 x 4 x 5			29250	57,330	
7 Divide line 6 by 57,330 and multiply by 100		S_{gw} = 51.02			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

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8/2/89
WMG

Surface Water Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Release	(0) 45	1	0	45	4.1
If observed release is given a value of 45, proceed to line 4. If observed release is given a value of 0, proceed to line 2.					
2 Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 (2) 3		2	3	
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3	
Distance to Nearest Surface Water	0 1 (2) 3	2	4	6	
Physical State	0 1 2 (3)	1	3	3	
Total Route Characteristics Score			11	15	
3 Containment	0 1 2 (3)	1	3	3	4.3
4 Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 (8)	1	8	8	
Total Waste Characteristics Score			26	26	
5 Targets					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	(0) 1 2 3	2	0	6	
Population Served/Distance to Water Intake Downstream	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	
6 If line 1 is 45, multiply 1 x 4 x 5 / If line 1 is 0, multiply 2 x 3 x 4 x 5			5148	64,350	
7 Divide line 6 by 64,350 and multiply by 100		S_{SW} = 8.00			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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Air Route Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
[1] Observed Release	0 45	1		45	5.1
Date and Location:					
Sampling Protocol:					
If line [1] is 0, then S_a = 0. Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score			20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100		S_a =			

FIGURE 9
AIR ROUTE WORK SHEET

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	S	S^2
Groundwater Route Score (S_{gw})	51.02	2603.04
Surface Water Route Score (S_{sw})	8.00	64.00
Air Route Score (S_a)	———	———
$S_{gw}^2 + S_{sw}^2 + S_a^2$		2667.04
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		51.64
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		29.85

FIGURE 10
WORKSHEET FOR COMPUTING S_M

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Not Scored

Fire and Explosion Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1 3	1		3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 3	1		3	
Ignitability	0 1 2 3	1		3	
Reactivity	0 1 2 3	1		3	
Incompatibility	0 1 2 3	1		3	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
Total Waste Characteristics Score				20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 3 4 5	1		5	
Distance to Nearest Building	0 1 2 3	1		3	
Distance to Sensitive Environment	0 1 2 3	1		3	
Land Use	0 1 2 3	1		3	
Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
Total Targets Score				24	
4 Multiply 1 x 2 x 3				1,440	
5 Divide line 4 by 1,440 and multiply by 100		S_{FE} =	N.S.		

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

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WHG

Not Scored

Direct Contact Work Sheet					
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
[1] Observed Incident	0 45	1		45	8.1
If line [1] is 45, proceed to line [4] If line [1] is 0, proceed to line [2]					
[2] Accessibility	0 1 2 3	1		3	8.2
[3] Containment	0 15	1		15	8.3
[4] Waste Characteristics Toxicity	0 1 2 3	5		15	8.4
[5] Targets					8.5
Population Within a 1-Mile Radius	0 1 2 3 4 5	4		20	
Distance to a Critical Habitat	0 1 2 3	4		12	
Total Targets Score				32	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]				21,600	
[7] Divide line [6] by 21,600 and multiply by 100	S_{DC} =				

FIGURE 12
DIRECT CONTACT WORK SHEET

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WHC